DOCUMENT RESUME

ED 025 336 PS 001 497

By- Johnson, Virginia

Auditory Components of Neonatal Experience: A Preliminary Report.

Pub Date 66
Note- 5p.
Journal Cit- Proceedings of the Symposium on Biomedical Engineering; vl p189-92 1966
EDRS Price MF- $0.25 HC- $0.35
Descriptors- Auditory Perception, *Aural Stimuli, Conditioned Response, *Early Experience, Infant Behavior, *Infants, Parent Influence, *Recall (Psychological)
Identifiers- Experiential Recall

The nature and significance of the conditioning of fetal and neonatal response systems for later learning was not clearly understood. Therefore, subjects chosen for this research project were people who had been trained in experiential recall. During recall the subjects spontaneously reported what appeared to be auditory components of a complex conditioning situation related to birth or speech and neonatal environment. These auditory components were then correlated with the speech and somatic symptomatology observed in the subjects. It was concluded that prenatal or neonatal trauma may contribute to later neural disorganization and functional psychopathology. This result supports the hypothesis that when the birth experience is traumatic, there is a tendency to establish potentially pathogenetic responses. If subsequent experiences reinforce the tendency by approximating the traumatic variables, such conditioning may lead to various forms of psychopathology. Also, words heard by an infant before he understands speech may affect his learning later. (WD)

U. S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

AUDITORY COMPONENTS OF NEONATAL EXPERIENCE: a preliminary report *

Virginia Johnson, Ed.D.
1516 Westwood Boulevard
Los Angeles 24, California

ED025336

ABSTRACT

THE RESEARCH PROBLEM

While reported findings from several disciplines have established the conditionability of fetal and neonatal response systems, (Ref. 1) the nature and significance of such conditioning for later learning is not clearly understood, nor are the controlling variables known. Particular emphasis is being placed on research into cause and effect sequences between prenatal and/or neonatal trauma and later forms of neural disorganization and functional psychopathology.

Certain of our preliminary clinical findings appear to indicate that early auditory conditioning may contribute to these psychiatric syndromes. It is well known that such syndromes are characterised by pathological speech mechanisms or by semantic-somatic feedback replated to dysfunction in what Pavlov termed the second signal system. (Ref. 2) The preliminary hypothesis is therefore suggested that words or nonverbal sounds conditioned as auditory elements prior to patterned speech learning may have significance for later learning; that such responses may be established as early as the auditory cortex is available; that these auditory elements are part of a larger stimulus-response complex; and that later learning and the development of the second signal system may form positive or negative feedback circuits with this complex which are significant with respect to psychopathology. (Appendix A)

ED025336

METHOD AND SUBJECTS

In connection with a research program in behavioral psychotherapy now in its sixth year, it was found that certain subjects who were routinely trained in techniques of experiential recall spontaneously reported what appeared to be auditory components of a complex conditioning situation related to the experience of birth or at least the neonatal environment. (Appendix B) Extinction of the repetitive, stereotyped, and pathological feedback mechanisms usually followed such recall experiences. (Appendix C).

When these verbatim protocols were correlated with presenting psychopathological symptoms, including speech patterns characteristic of the individual, a clear connection could be established between natal experience and known case history and symptomatology.

In spite of the admitted limitations of findings derived from clinical observations, theory based upon what might be called retrospective reconstruction is not new to research in the behavioral sciences; it has, in fact, almost classic his-

PS001497

torical confirmation. Psychoanalytic theories with respect to psychopathology and emotional development are based upon such reconstructive data; and Piaget's theoretical inferences on development were obtained partly from observing and systematizing objective data, and partly from introspective reporting. (Ref. 3) Experiential recall was reported by Wilder Penfield in connection with his research on the brain by means of implanted electrodes. (Appendix D)

FINDINGS

Auditory components of the neonatal environment reported during experiential recall when correlated with speech and somatic symptomatology observed currently in the same subjects indicate the following:

1. Both verbal and nonverbal elements of auditory stimuli may be conditioned neonatally, during and after the birth experience, and possibly before.

2. Such auditory elements are part of a complex conditioning experience involving not only the sensory modalities but the autonomic response systems as well.

3. In certain cases such conditional auditory stimuli appear to be significant in later learning, especially with respect to the etiology of psychopathology.

4. All of the controlling variables of this etiology are not known, but the preliminary findings would seem to indicate that at least one such variable is paranatal neuro-physiological trauma, such as that of anoxia or hypoxia, injury to the brain from instruments or because of the delivery procedures, or severe reactions in the cardiovascular system for which emergency measures may be required.

5. To what degree later reinforcement is a factor is at present conjectural, but our histories indicate that such reinforcement frequently occurs during later developmental periods, as for example respiratory depression under anesthesia, concussion, comatose states or febrile delirium accompanying childhood illnesses, and so on. Such reinforcement may have elements involving either the first or second signal systems, or both.

COMMENTS AND DISCUSSION

It has been repeatedly stated that in the Pavlovian sense words are signals for reactions occuring in the various levels of the first signal system, and that the second signal system is in no way isolated from the first system, either during normal or pathological development. Theoretically, auditory stimuli may become conditional at any time after structure reaches sufficient maturity to permit response activation to occur. The significance of this fact for the ontogenetic development of the second signal system is not clearly defined.

If the proposed hypothesis is confirmed, the "auditory elements" in early experiences may become conditional stimuli related to responses in which the first signal system may be domi-

nant but not necessarily exclusive. The experience is in situi not cognitively contexted because of the immaturity of structure-function in the neonate; but is in and of itself an occasion for the conditioning of available neurophysiological responses which at primitive levels may be experienced as a threat to the organism.

Such organismic responses are therefore potentially anxiety-producing, especially if reinforced by later similar experiences which spontaneously arouse the conditional responses either in the first signal system (eg. head trauma, anoxia, restriction of movement), or in the second system (eg. word elements or speech associations). Variables related to reinforcement apply to the pathogenic behavioral sequence as well as to any other when learning is involved.

It should surprise no one that discrete factors, including auditory components, in the neonatal experience may become conditional stimuli. It is stating the obvious to point out that any stimulus (endogenous or exogenous) may become "conditional" in a complex learning situation with respect to available responses. Examples from the neonatal external environment might include any of the sensory stimuli from the delivery room and the obstetrical procedures; and internally include such responses as changing heart rate, blood pressure, kinesthetic experiences, the establishing of respiratory response, and so on.

When the birth experience is itself traumatic, it has been hypothesized that there is a tendency to establish potentially pathogenetic responses. If subsequent experiences reinforce this conditioning, by approximating its traumatic variables, such conditioning may lead to various forms of psychopathology. The exact point at which the original or reinforcing experiences may precipitate psychopathology is probably unique to the individual, but if there is a consistent correlation of such symptomatology with experiential recalls, cause and effect relationships may be a reasonable hypothesis.

Three (of many) logical assumptions would be: (1) that only words which tend to be anxiety-producing after meaning and context are learned would be significant as feedback stimuli to earlier auditory elements; or (2) that auditory elements (verbal or nonverbal) associated with anxiety experiences have a negative potential irrespective of their meaning; or (3) a combination of both (1) and (2).

It is suggested here for purposes of discussion that only (2) is essential in feedback mechanisms related to psychopathology. To say it another way, the conditioning of auditory elements and/or word components at any developmental age, unaccompanied by first signal system responses which are experienced as threatening to the organism, will predictably not contribute to pathogenesis.

If the stated hypothesis proves valid with later research, there are significant implications for several disciplines, including cybernetics, the medical specialties of obstetrics, neonatology, and pediatrics, and of course for psychotherapy and psychiatric practice.

CONCLUSIONS

Based on the reported clinical findings, the suggested hypothesis seems justified that words or nonverbal sounds heard by the infant prior to patterned speech learning may constitute prior auditory conditioning experiences with significance for later learning. With respect to the etiology of psychopathology characterised by disorders in the second signal system, and by semantic-somatic feedback mechanisms, prior conditioning established during infancy or the paranatal period may be of pathogenetic significance.

APPENDIX

A. It is not the intention here to debate Pavlovian or neo-Pavlovian theory, but to state as a basic assumption that the neurophysiological model developed by Pavlov and others provides a construct within which behavioral sequences may be codified or interpreted, and which has in the last two decades been the subject of intensive research. (Ref. 4)

The "speech cortex" and clinical evidence of verbal pathology in schizophrenia and other functional disorders has been exhaustively studied. (Ref. 5) "Primitive" verbal reactions are characteristically dominant during acute psychosis, and with clinical improvement eventually are replaced by more sophisticated responses. The continuum of primitive (stereotypical) responses ranges from the noverbal gesture, through echolalia, to a transitional category preceding the elaboration of higher level contexted speech. (Ref. 6) As verbal reinforcement proceeds, "in the human being the second signalling system normally and also in most pathological conditions predominates over the first signaling system." (Ibid. p. 31)

B. Astrup summarises the behavioral research on word learning (development of the second signal system) as related to at least three components: (1) the statokinetic (a fixed position of the body); (2) a constant visual and (3) a constancy of the auditory stimuli. (Ref. 7) It is these three cues which in the main constitute the basis of our recall technique, working from the statokinetic and visual components to the auditory, until the total recall situation is obtained. Subjective awareness and objective behavior sequences reflect the statokinetic component of the original experience following positioning of the subject's hands and arms in line with involuntary tensions.

C. Observations of our subjects is continuing, and because of the process predictability and improved techniques we expect the number of identifiable birth experiences will eventually be much higher than the cases selected for this preliminary report.

D. Experiential recall is described by Wilder Penfield as follows: "...experience unfolds progressively, moment by moment ...Absent from it are the sensations the subject ignored, the talk he did not heed... Time's strip of film runs forward, never backward...It would seem...that the response is protected by a functional all-or-nothing principle...As long as the electrode is held in place, the experience of a former day goes forward. When the electrode is withdrawn, it stops as suddenly as it began. (Ref. 8)

Penfield had no doubt that the elicited recalls were real happenings out of the past, although not always part of conscious memory. His subjects did not experience these recalls as "remembering", but as a hearing-again or seeing-again moments of past time. The recall phenomena observed in our subjects reflect these criteria almost exactly.

REFERENCES

1. Albrecht Peiper, Cerebral Function in Infancy and Childhood, Consultants Bureau, New York, 1963

2. I.P. Pavlov, Conditioned Reflexes and Psychiatry, International Universities Press, New York, 1941, pp. 113-114

3. Peter H. Wolff, The developmental psychologies of Jean Piaget and psychoanalysis, Psychological Issues, II: 1, Monograph 5, Inter-psychoanalysis, Psychological Issues, II: International Universities Press, New York, 1960

4. Thomas Ban, Conditioning and Psychiatry, Aldine, Chicago, Ill., 1964, p. 11

5. Dean E. Wooldridge, The Machinery of the Brain, McGraw-Hill, New York, 1963 pp. 153-165

6. Christian Astrup, Schizophrenia: Conditional Reflex Studies, Chas. C. Thomas, Springfield, Ill., 1962, pp. 14-28

7. _____, Pavlovian Psychiatry: A New Synthesis, Chas. C. Thomas, Springfield, Ill., 1966, pp. 60-65

8. Wilder Penfield and Lamar Roberts, Speech and Brain Mechanisms, Oxford University Press, London, 1959, p. 53

PS001497

* Published in Proceedings of the Symposium on Biomedical Engineering, 1, 1966, Milwaukee, Wisconsin, 189-192